

FIG. 1

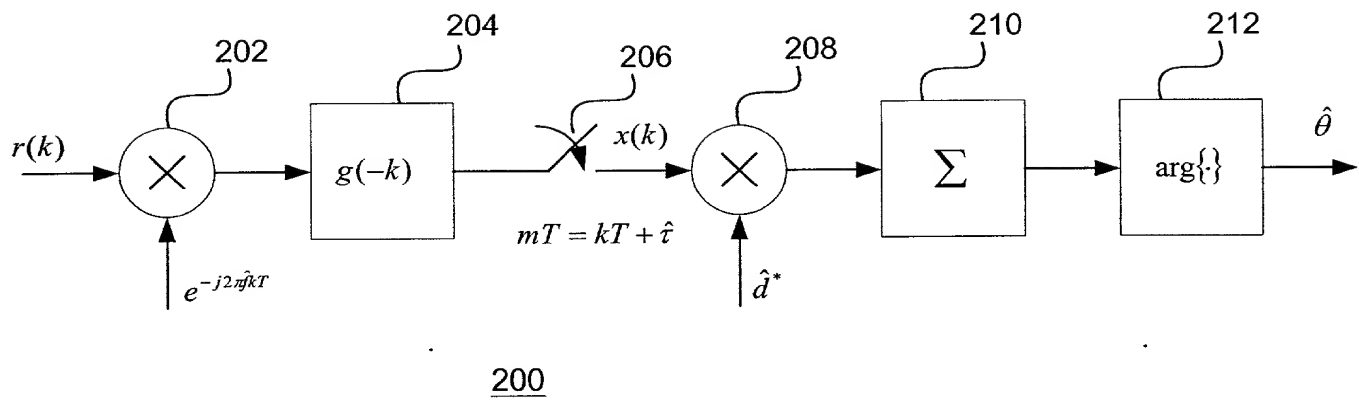


FIG. 2 (PRIOR ART)

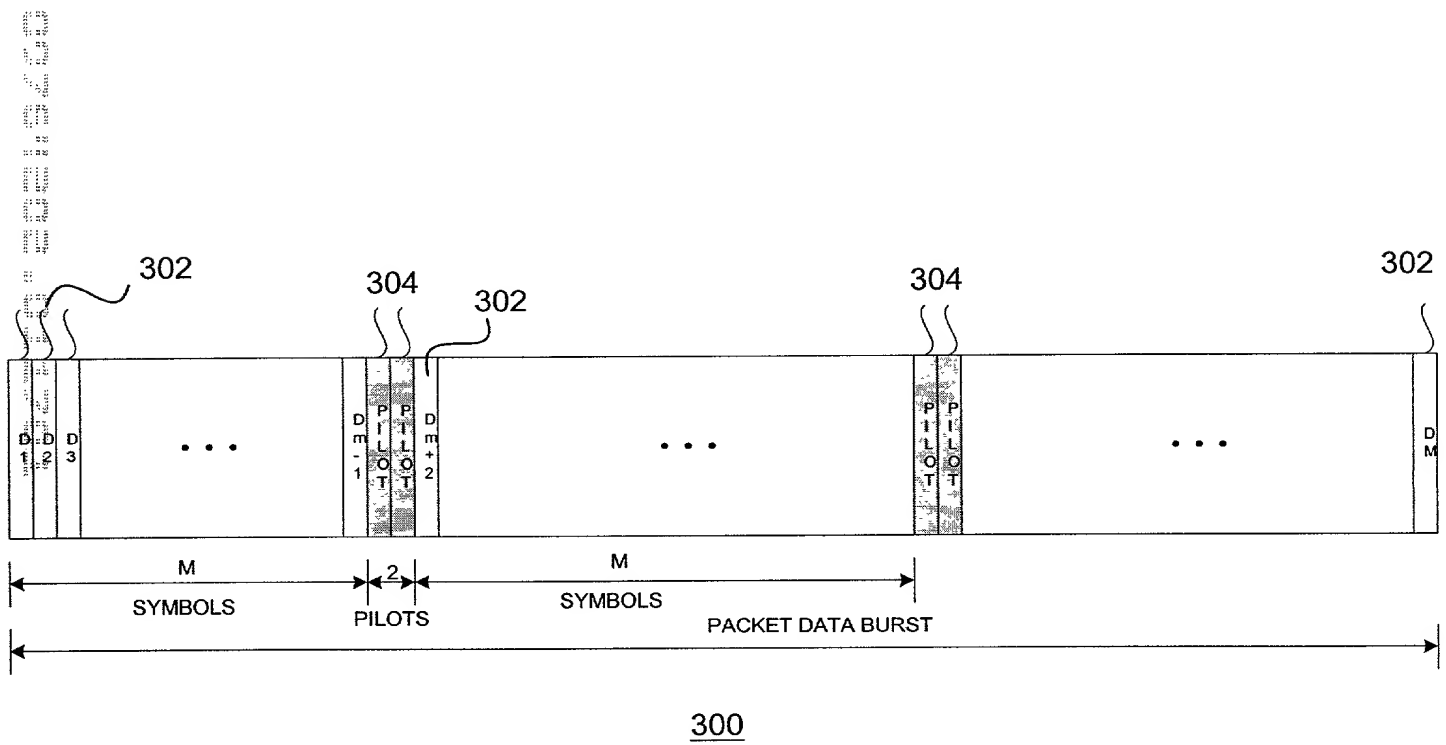


FIG. 3

FIG. 4 is a block diagram of a digital signal processing system 400. The system 400 includes a delay element 402, a non-adaptive T/N-spaced equalizer 408, a carrier phase recovery unit 410, an adaptive T/N-spaced equalizer 406, and a RAM (equalizer weights) 412. The system 400 is controlled by a SELECT signal 430. The input signal i1 is split into two paths. One path goes through the delay element 402 to produce i6, which is then multiplied by i5 in multiplier 404 to produce z1. The other path goes through the non-adaptive T/N-spaced equalizer 408 to produce i2, which is then processed by the carrier phase recovery unit 410 to produce i5. The output of the adaptive T/N-spaced equalizer 406 is i7, which is fed back to the RAM 412. The RAM 412 outputs i3 to the non-adaptive T/N-spaced equalizer 408. The output of the system 400 is i7, which is also labeled as 422.

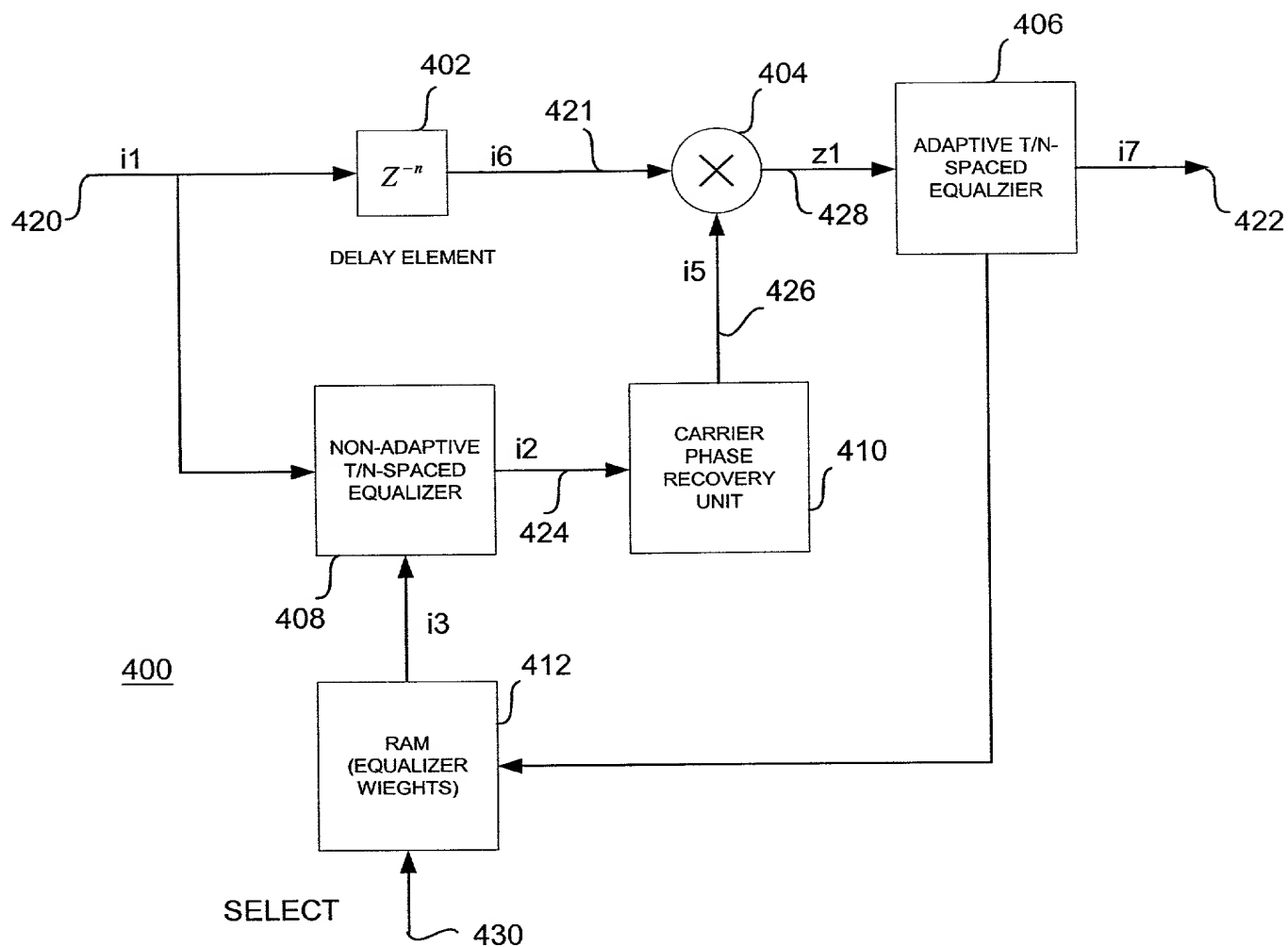


FIG. 4

FIG. 5 is a block diagram of a carrier phase estimation system. The system is divided into two main sections: Pilot-Aided Based Carrier Phase Estimation (top) and Data-Aided Based Carrier Phase Estimation (bottom). The Pilot-Aided section (500) takes an input signal (424) and extracts pilot signals (P1, P2) using a PILOT EXTRACT block (506). These signals are then processed through a series of blocks: a summing junction (508) with a negative feedback path, a CORDIC Algorithm (510), another summing junction (512) with a constant input of  $\pi/4$ , a Table Look Up block (514), and a Complex Conjugate block (516) to produce output signal 518. The Data-Aided section (502) takes the same input signal (424) and processes it through a delay block (520), a summing junction (522), an M-QAM Slicer (524), a Complex Conjugate block (526), a summing junction (528), and another summing junction (530) with a feedback path from a Unit Delay block (532). The output of the summing junction (530) is signal 534, which is then processed by a CORDIC block (504), a Table Look Up block (536), and a Complex Conjugate block (538) to produce the final output signal 426.

FIG. 5

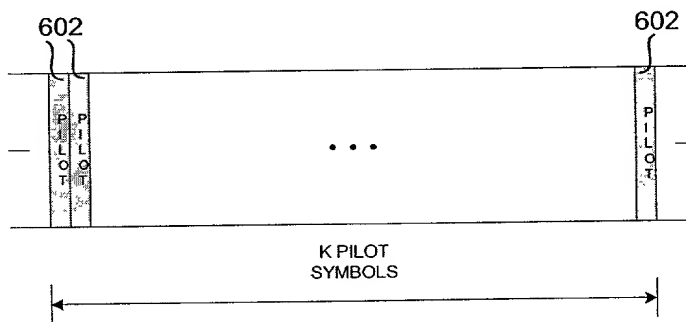
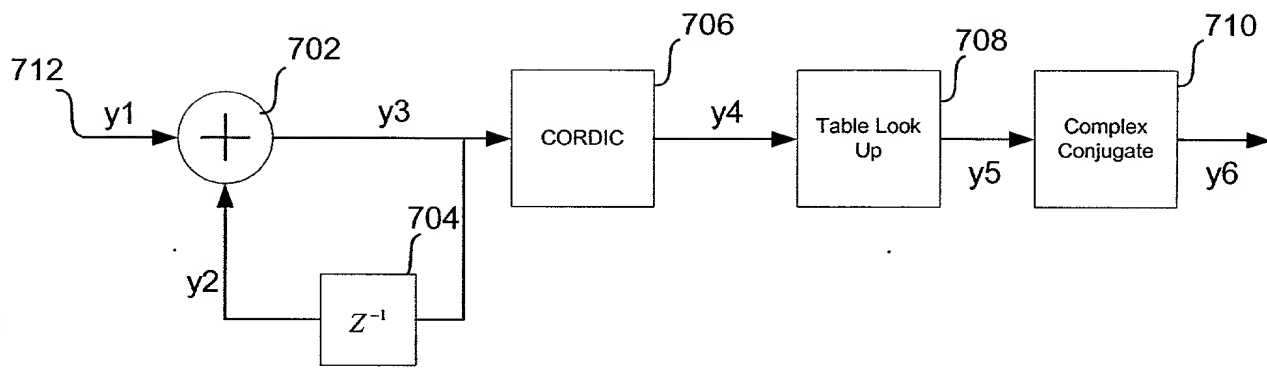


FIG. 6

600



700

FIG. 7